

Otto Schneid,
Papers

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- 1) The first master in the aesthetics of architecture, and the teacher of many generations following him, was the Roman Vitruvius. It is not known for certain when he lived, but we surmise it was in the first century B.C. The greatest of his followers was the Italian architect and author, Leon Battista Alberti (d. 1472). After him came Sebastiano Serlio (d. 1552) Giacomo Barozzi da Vignola (1507 - 1573), Andrea Palladio (1518 - 1580), the outstanding architectural theorist and creator of a notable school of architecture, and, finally, Vincenzo Scamozzi (d. 1616). In France the most noteworthy thinker and creators in the art of building were Philibert de l'Orme (d. 1570), Jean Bullant (d. 1578), Jacques Androuet du Cerceau (about the same period), Francois Blondel (d. 1686). In England, in the 18th Century, Colin Campbell (d. 1734) and William Adam (d. 1748) rose to fame.

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What is Architecture? *A Different Conception*

Since its inception, architecture has occupied a focal position in the study of aesthetics; in particular, architects have advanced theories on architecture in general, and on its nature. But all these outstanding authors, and those who followed them, were Europeans; they were not acquainted with the architecture which existed outside their civilization. All their ideas, and the laws which they formulated, were therefore based on too limited empirical foundations. In the light of the latest scientific achievements, it becomes clear that they did not reach the generality and objectivity at which they had aimed, and which are justified only by universal applicability. Let us try to understand the fundamentals of architecture, not according to styles, because these are the results of historical development, but according to basic principles and original forces which can assume the forms that become, under suitable conditions, what we call styles.

The roots of architecture lie in the material world, in the practical world of man and society, while the summit stretches upwards, into the world of spirit and beauty.

The dwellings of primeval man were, it seems, caves and places with improvised natural cover. The magnificent paintings in the caves, preserved from the Early Stone Age, indicate that wild men dwelt in them. They hunted for their food and waged a ceaseless aggressive and defensive war against the wild animals. The brutal conditions under which they lived forced them to develop a keen sense of observation of their surroundings and an almost infallible sense of perception, which expressed itself in the form of these wall paintings, the very earliest known. However, whatever has remained of early man's proper building is a survival only of the Neolithic Age. In this age men organised themselves into groups, larger than families, and the centre of growth of their economy shifted from hunting to the tilling of the land and the raising of cattle. These new conditions blunted their faculty of quick observation and strengthened in them different aspects of artistic skill. In the course of his observing the revolutions of the sun, the moon and the stars, and their cycles according to the seasons of the year, there is awakened in the peasant the feeling for law and order, the feeling for, and the appreciation of, rhythm. The man of the New Stone Age was less skilled in his attempts to imitate nature and to depict the phenomena of the living world. But at the same time he learned to express by other means his innermost thoughts and his conception of the universe, and his impressions of his surroundings and his daily life. The means of his artistic expression are patterns symbolizing his impressions and thoughts, signs drawn in regular and recurring form - ornaments. In that period only, man became capable of building. The remains of buildings of Neolithic Man show a surprising similarity to the buildings of some contemporary wild tribes. This analogy supplements our knowledge of pre-historic buildings. Both in Neolithic building and in that of contemporary savage tribes corresponding to this evolutionary stage, there are houses built on piles (fig. 1), standing both in water and on dry land; both types were for defence against wild beasts and the enemies of man. From the common features of the pre-historic buildings and the building of primitive tribes, we may conclude that the primary purpose of architecture is, in general, that of shelter and defence. To this basic aim of architecture there were added, in the course of the evolution of human needs, many other aims. Besides houses built for the living, tombs were built in the Neolithic Age, and they testified to the early realization of man's connection with death and conception of religious ideas. With the growth of the social group from the first cell, the family, to larger groups,

there arose the need for public buildings. Through his veneration of the forces of nature, man came to building houses of worship. The rise to power of rulers expressed itself in buildings distinguished for their size and strength and their aesthetic perfection. The increasing demands of developing human civilization - crafts of various kinds, industry, commerce and law, transport, entertainment, sport, etc. led to different kinds of buildings. Religions, as they developed, became especially rich sources of forces creating architecture.

The purpose of architecture, however, does not yet define its nature. We shall come to the understanding of its nature by considering some antithetical basic ideas, such as mass and space. Every idea becomes clearer when it appears in its pure state and is not mixed with other ideas. Mass as a creative element is realized almost perfectly in the Egyptian Pyramids. When their constructors amassed these regular gigantic heaps or piles, they left inside them only a very small cavity. The Pyramids are almost solid bodies, nearer to the spirit of sculpture than to that of architecture in its accepted sense. The same applies also to pre-Columbian pyramids on the American continent, (fig. 2) which seem to have been used as bases for sacrificial altars and astrological stations. In India a similar type was created. This is the Stoop (fig. 3) (appearing for the first time in the middle of the 3rd Century B.C.) which is hemispherical in form and can be likened to an evanescent water-bubble. It grows and vanishes, and is, in India, the symbol of its contrast, eternal being. The Stoop is devoid of openings and internal spaces, and contains only minute boxes in which are stored relics of the Buddha. In Indo-China, Stoops assume other forms, closer to towers. In the island of Java, through the efforts of many generations, the richest and most complicated form of stoops was created. These represented the most highly developed form of stoop. In contrast to this category, which contains a maximum of materials and a minimum of space, let us consider, for example, the Church of St. Sophia in Constantinople (fig. 4) (6th Century), and the splendid mosques built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being lofty and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, on which the vaults are suspended, is reduced to a surprising minimum. Here the space overpowers the mass to a striking extent.

This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tiles, wood, iron, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious caves, (fig. 5) some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, the remnant of the natural rock left after hewing. These caves, which are in the main shaped by the hand of man, are the outcome of the wrestle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. In other countries, though to a lesser extent than in India, more or less regular caves were also hewn out, or existing caves enlarged. The spirit of hewing out of rock is also sensed in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression.

In the continuation of this architectural tendency, however, in which space was victorious over existing mass, mass again becomes dominant. In Southern India, (fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-hewers, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the "houses" and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle of monolithic buildings is realized to a more limited extent.

Now that we have considered these phenomena, which considerably enlarge the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of masses, i.e. of closed solids; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic animation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the Romanesque churches of Western and Central Europe. The main body of the Roman Pantheon, (fig. 7) or the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. Very many of the gigantic buildings in modern America (fig. 8) also belong to this category. Their mighty masses are at times shaped with an almost musical rhythm, with reciprocating connections, with harmony between parts and with descending movements within a general ascending motion. In the opposing system a differentiation in construction is developed. The most characteristic parts of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing but partitions which enclose the interior. In Ancient Greece (fig. 9) these partitions were placed inside the columns, and in the Far East (fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Entire bundles of columns rise up inside the building (fig. 11) and their capitals do not interrupt the soaring motion, but act as a kind of springboard projecting the motion into the ribs of the vaults. The segments which are spanned across the ribs are mainly "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (fig. 12), which run alongside the aisles the whole length of the building. Above the side aisles flying buttresses project from the height of the nave and transfer a considerable part of the thrust of its vault onto the external vertical buttresses.

This system of construction necessarily leads us to aesthetic categories proper. These are primarily based on the properties of the materials used. Let us recall the Babylonian and Assyrian buildings (fig. 13) in which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich quarries of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring works, the materials found in the countries around the Euphrates and the Tigris were in the main clay or lime, which, even when rammed, is unable to resist the force of rain water for a long time. A certain measure of preservation was afforded by air-dried bricks. Better bricks were obtained by firing and additional strength was given to the surface by glazing.

Though unintentional at first, these technical methods led to aesthetic improvements. Glazing combined with coloring led to variety and enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "facades" - not only Mesopotamia - and they explain the existence of the facade in general, i.e. the embellished face of the house. Only when the material itself is inferior does a technical and aesthetic covering and overlaying become necessary.

For the facade is, in itself and according to its proper nature, a thing untrue, even artificial or fictitious. Only in the most highly developed architecture was the facade also able to become a faithful expression of the interior organization of the house and its structure. When, however, the material is superior by nature, the need for camouflage does not arise. It will be revealed unadorned, and its appearance alone, in all its naivety, will have artistic value. The Greek house is a good example also of the qualities resulting from the use of superior materials. In modern architecture, or at least in its early stages, an appreciation of the correct use of materials was born anew. The first pioneers in this venture, who wished to do justice to materials, disapproved of imitation, as in reproducing in metal the forms characteristic of wood, or coloring sheets of tin to give the impression of marble. Every material has its own innate property of form, and the modeling of one material according to the properties of another constitutes a falsification. In modern architecture the prevailing tendency is to exhibit and emphasize the nature of steel, concrete, glass, etc. This emphasis became a rich source of beauty.

For the attainment of beauty in architecture, two other courses were followed. One employs a variety of additions and trimmings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the abundance of adornment sometimes conceals the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Basil in Moscow, for instance, the load of ornaments envelops most of the building, and almost hides it from the eye. The towers or cupolas, in their weird multiplicity, no longer serve any use of purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and sculptural expression assumed its most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1550-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a reckless swaying and sea of fantastic projections strangle the fundamental body of the building. Let us again recall the classic creations of Greece, from this viewpoint as well. A simple construction is characteristic of the Greek art of building, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this form of architecture is distinguished by well-conceived proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases the eye and exalts the spirit. Numerous houses in China are also distinguished by this tranquil simplicity. The adornments found in both these countries are not

arbitrary additions. In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction when it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly upswept lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: The system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged. The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture. The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamics, a form approaching organic life. In opposition to this, the Egyptian Pyramid, for example, expresses the quiescent form, eternal existence, statics and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquility, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of greatness and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and

Renaissance architecture evoke in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religious and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of Occidentals. This rather more Western principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, firm and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and perfected. The Taj Mahal mausoleum (fig. 20), which was built in the 17th Century near Agra in India by one of the Moslem Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden¹⁾. In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalize rulers

1) In connection with this masterpiece, let us mention garden architecture in general and, in particular, three of its main styles. The Chinese garden is concentrated nature, reflecting its rich variety in miniature; the Persian garden is further removed from the natural state of the landscape and *stylizes* it; the French garden, particularly since the gardens of Versailles, introduces into the landscape artificial forms, foreign to nature, yet the result is superb due to the vast amount of planning put into its creation.

and ruling social groups which originally led to the creation of solemn and enduring architectural forms, which evoked in the onlooker a feeling of his smallness. With the best types of monumental building, however, he is not left with a feeling of abandonment, but is finally uplifted. The greatness radiating from these buildings awakens in him a feeling of awe and reverence. He will indeed feel smaller, so to speak, and bow his head, but together with this feeling of reverence, and in spite of it, he will experience a deep and unique feeling of happiness. This psychological reaction could perhaps be explained as a kind of sharing in the creation.

The majority of architectural constructions were created anonymously. Most of the creators therefore worked for the love of the work itself and dedicated their lives to it. But still more worthy of our admiration are whole generations who sacrificed themselves to these creations, knowing that they had no hope of seeing their labour completed or enjoying its fruits. This heroism can be understood only by the force of great ideas which inspired these generations to the point of self-sacrifice. This is a moral lesson which architecture teaches.

Dr. Naftali (Otto) Schmidt

What is Architecture?

Since its inception, architecture has occupied a focal position in the study of aesthetics; in particular, architects have advanced theories on architecture in general, and on its nature.¹⁾ But all these outstanding authors, and those who

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Followed then, were Europeans. In spite of the depth of their writings, it seemed that they were not acquainted with the architecture which existed outside their civilization. All their ideas, and the laws which they formulated, were therefore based on too limited empirical foundations. In the light of the latest scientific achievements, it becomes clear that they did not reach the generality and objectivity at which they had aimed, and which are justified only by universal applicability. Let us try to understand the fundamentals of architecture, not according to styles, because these are the results of historical development, but according to basic principles and original forces which can assume the forms that become, under suitable conditions, what we call styles.

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This first antithesis, mass and space, which, as we have considered, leads us to a method of building through which we approach the quantitative method of building according to its accepted definition, namely, the joining of parts of different materials - stone, brick, wood, etc., into units generally called houses.

This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious caves, (fig. 5) some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, the remnant of the natural rock left after hewing. These caves, which are in the main shaped by the hand of man, are the outcome of the wrestle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. In other countries, though to a lesser extent, than in India, more or less regular caves were also hewn out, or existing caves enlarged. The spirit of hewing out of rock is also expressed in built houses where the volume of pillars and other internal parts is not less than the free space between them.

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Above the side aisles flying buttresses project from the height of the nave and transfer a considerable part of the thrust of its vault onto the external vertical buttresses.

This system of construction necessarily leads us to aesthetic categories proper. These are primarily based on the properties of the materials used. Let us recall the Babylonian and Assyrian buildings (fig. 13) in which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich quarries of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring works, the materials found in the countries around the Euphrates and the Tigris were in the main clay or lime, which, even when rammed, is unable to resist the force of rain water for a long time. A certain measure of preservation was afforded by air-dried bricks. Better bricks were obtained by firing and additional strength was given to the surfaces by glazing. Though unintentional at first, these technical methods lead to aesthetic improvements. Glazing combined with coloring led to variety and enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "facades" - not only in Mesopotamia - and they explain the existence of the facade in general, i.e. the embellished face of the house. Only when the material itself is inferior does a technical and aesthetic covering and overlaying become necessary.

For the facade is, in itself and according to its proper nature, a thing untrue, even artificial or fictitious. Only in the most highly developed architecture was the facade also able to become a faithful expression of the interior organization of the house and its structure. When, however, the material is superior by nature, the need for camouflage does not arise. It will be revealed unadorned, and its appearance alone, in all its naivety, will have artistic value. The Greek house is a good example also of the qualities resulting from the use of superior materials. In modern architecture, or at least in its early stages, an appreciation of the correct use of materials was born anew. The first pioneers in this venture, who wished to do justice to materials, disapproved of imitation, as in reproducing in metal ^{the} forms characteristic of wood, or coloring

sheets of tin to give the impression of marble. Every material has its own innate property of form, and the modeling of one material according to the properties of another constitutes a falsification. In modern architecture, ^{the} prevailing ~~is~~ tendency is to exhibit and emphasize the nature of steel, concrete, glass, etc.,. This emphasis became a rich source of beauty. For the attainment of beauty in architecture, two other courses were followed. One employs

variety of additions and trimmings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the abundance of adornment sometimes conceals the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Basil in Moscow, for instance, the load of ornaments envelops most of the building, and almost hides it from the eye. The towers or cupolas, in their weird multiplicity, no longer serve any use or purpose, and are there for the sake of the pictorial impression only. The desire for pictorial

and sculptural expression assumed its most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1550-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a reckless swaying and sea of fantastic projections strangle the fundamental body of the building. Let us again recall the classic creations of Greece, from this viewpoint as well. A simple construction is characteristic of the Greek art of building, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this ^{form of architecture} ~~material~~ is distinguished by well-conceived proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases

the eye and exalts the spirit. Numerous houses in China are also distinguished by this tranquil simplicity. The adornments found in both these countries are not arbitrary additions. In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction, when it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effects of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly up-sloped lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: The system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged.

The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture.

The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamics, a form approaching organic life. In opposition to this, the Egyptian pyramid, for example, expresses the quiescent form, eternal existence, statics, and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquility, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - Liberation of spiritual forces, or the arousing of feelings of greatness and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and Renaissance architecture evoke in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as

perfectly as possible, and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religions and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of occidentals. This rather more eastern principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, grim and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and

perfected. The Taj Mahal mausoleum (fig.20), which was built in the 17th Century near Agra in India by one of the Moslem Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾

2) In connection with this masterpiece, let us mention garden architecture in general and, in particular, three of its main styles. The Chinese garden is concentrated nature, reflecting its rich variety in miniature; the Persian garden is further removed from the natural state of the landscape and stylizes it; the French garden, particularly since the gardens of Versailles, introduces into the landscape artificial forms, foreign to nature, yet the result is superb due to the vast amount of planning put into its creation.

In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalize rulers and ruling social groups which originally led to the creation of solemn and enduring architectural forms, which evoked in the onlooker a feeling of his smallness. With the best types of monumental building, however, he is not left with a feeling of abandonment, but is finally uplifted. The greatness radiating from these buildings awakens in him a feeling of awe and reverence. He will indeed feel smaller, so to speak, and bow his head, but together with this feeling of reverence, and in spite of it, he will experience a deep and unique feeling of happiness. This psychological reaction could perhaps be explained as a kind of sharing in the creation.

The majority of architectural constructions were created anonymously. Most of the creators therefore worked for the love of the work itself and dedicated their lives to it. But still more worthy of our admiration are whole generations who sacrificed themselves to these creations, knowing that they had no hope of seeing their labor completed or enjoying its fruits. This heroism can be understood only by the force of great ideas which inspired these generations to the

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point of self-sacrifice. This is a moral lesson which architecture teaches.

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Dr. Raffaele (Otto) Schmidt (Professor, The Israel Institute of Technology)

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The building of prehistoric man was, it seems, more and more with improved technical means. The magnificent paintings in the caves, preserved from the early Stone Age, indicate that man built in them. They looked for their food and sought a suitable shelter and defense was against the wild animals. The brutal conditions under which they lived forced them to develop a new sense of observation of their surroundings and an almost instinctive sense of perspective, which expressed itself in the form of those wall paintings, the very earliest form. However, whether we speak of early man's proper building is a survival only of the Neolithic age. In this age we understand themselves into groups, larger than families, and the centers of growth of their society shifted from leading to the village of the food and the village of cattle. These new conditions changed their faculty of visual observation and observation in their different aspects of artistic skill. In the course of the observation the realization of the sun, the moon and the stars, and their cycles according to the seasons of the year, there is achieved in the peasant the feeling for his order, the feeling for, and the appreciation of, rhythm. The sun of the last Stone Age was built in the village to satisfy nature and to depict the greatness of the living world. Not at the same time he learned to express by other means his innermost thoughts and the conception of the universe, and his impressions of his surroundings and his daily life. The means of his artistic expression are patterns symbolizing his experiences and thoughts, signs drawn in regular and recurring form - ornaments. In that period only, we become capable of building. The remains of buildings of Neolithic man show a surprising similarity to the buildings of some contemporary wild tribes. This analogy supplements our knowledge of prehistoric buildings. Both in Neolithic building and in that of contemporary savage tribes corresponding to this evolutionary stage, there are houses built on piles (Fig. 1), standing both in water and on dry land; both types were for defense against wild beasts and the enemies of man. From the common features of the prehistoric buildings and the buildings of primitive tribes, we may conclude that the primary purpose of architecture is, in general, that of shelter and defense. To this basic aim of architecture there were added, in the course of the evolution of human needs, many other aims. Besides houses built for the living, boats were built in the Neolithic age, and they testified to the early application of man's protection with both the construction of religious ideas. With the growth of the social group from the flock and, the family, to larger groups,

there arose the need for public buildings. Through his veneration of the forces of nature, man came to building houses of worship. The rise to power of rulers expressed itself in buildings distinguished for their size and strength and their aesthetic perfection. The increasing demands of developing human civilization - crafts of various kinds, industry, commerce and law, transport, entertainment, sport, etc. led to different kinds of buildings. Religions, as they developed, became especially rich sources of forces creating architecture.

The purpose of architecture, however, does not yet define its nature. We shall come to the understanding of its nature by considering some antithetical basic ideas, such as mass and space. Every idea becomes clearer when it appears in its pure state and is not mixed with other ideas. Mass as a creative element is realized almost perfectly in the Egyptian Pyramids. When their constructors amassed these regular gigantic heaps or piles, they left inside them only a very small cavity. The Pyramids are almost solid bodies, nearer to the spirit of sculpture than to that of architecture in its accepted sense. The same applies also to pre-Columbian pyramids on the American continent, (fig. 2) which seem to have been used as bases for sacrificial altars and astrological stations. In India a similar type was created. This is the Stupa (fig. 3) (appearing for the first time in the middle of the 3rd Century B.C.) which is hemispherical in form and can be likened to an evanescent water-bubble. It grows and vanishes, and is, in India, the symbol of its contrast, eternal being. The Stupa is devoid of openings and internal spaces, and contains only minute boxes in which are stored relics of the Buddha. In Indo-China, stupas assume other forms, closer to towers. In the island of Java, through the efforts of many generations, the richest and most complicated form of stupas was created. These represented the most highly developed form of stupa. In contrast to this category, which contains a maximum of materials and a minimum of space, let us consider, for example, the Church of St. Sophia in Constantinople (fig. 4) (6th Century), and the splendid mosques built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being lofty and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, on which the vaults are suspended, is reduced to a surprising minimum. Here the space overpowers the mass to a striking extent.

This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tiles, wood, iron, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious caves, (fig. 5) some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, the remnant of the natural rock left after hewing. These caves, which are in the main shaped by the hand of man, are the outcome of the wrestle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. In other countries, though to a lesser extent than in India, more or less regular caves were also hewn out, or existing caves enlarged. The spirit of hewing out of rock is also sensed in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression.

There arose the need for public buildings. Through his veneration of the forces of nature, man came to building houses of worship. The rise to power of rulers expressed itself in buildings distinguished for their size and strength and their aesthetic perfection. The increasing demands of developing human civilization - crafts of various kinds, industry, commerce and law, transport, entertainment, sport, etc. led to different kinds of buildings. Religions, as they developed, became especially rich sources of forces creating architecture.

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These were the need for public buildings. Through his veneration of the forces of nature, man came to building houses of worship. The rise to power of rulers secured of itself in buildings distinguished for their size and strength and their aesthetic perfection. The increasing demands of developing human civilization - crafts of various kinds, industry, commerce and law, transport, entertainment, sport, etc. led to different kinds of buildings. Religions, as they developed, became especially rich sources of forces creating architecture.

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This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tile, wood, iron, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious grottoes, (Fig. 5) some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, the remnant of the natural rock left after hewing. These caves, which are in the main shaped by the hand of man, are the outcome of the struggle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. In other countries, though to a lesser extent than in India, more or less regular caves were also hewn out, or existing ones enlarged. The spirit of hewing out of rock is also centered in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt certainly give us this impression.

There arose the need for public buildings. Through the domination of the forces of nature, we came to building houses of wood. The rise to power of rulers expressed itself in buildings distinguished for their size and strength and their artistic perfection. The increasing demands of developing human civilization - needs of various kinds, military, economic and law, transport, entertainment, sport, etc. led to different kinds of buildings. Religion, as they developed, became especially rich sources of finest creating architecture.

The purpose of architecture, however, does not yet define its nature. We shall come to the understanding of its nature by considering some artificial basic ideas, such as mass and space. Every idea becomes clearer when it appears in the pure state and is not mixed with other ideas. Mass as a creative element is realized almost perfectly in the Egyptian pyramids. When their constructors conceived these regular gigantic heaps or piles, they left inside them only a very small cavity. The pyramids are almost solid bodies, answer to the spirit of sculpture than to that of architecture in the accepted sense. The same applies also to pre-Columbian pyramids of the American continent, (Fig. 3) which seem to have been used as bases for sanctified objects and astronomical stations. In India a similar type was created. This is the Stupa (Fig. 3) (appearing for the first time in the middle of the 3rd century B.C.) which is hemispherical in form and can be likened to an evanescent water-lily. It grows and vanishes, and is, in India, the symbol of the contrast, eternal being. The Stupa is devoid of openings and internal spaces, and contains only narrow lanes in which are stored relics of the Buddha. In India, stupas assume other forms, closer to towers. In the island of Java, through the efforts of many generations, the richest and most complicated form of stupas was created. These represented the most highly developed form of stupas. In contrast to this rigidity, which contains a nucleus of materials and a minimum of space, let us consider, for example, the Church of St. Sophia in Constantinople (Fig. 4) (6th century), and the splendid mosque built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being lofty and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, on which the vaults are suspended, is reduced to a surprising minimum. Here the space overpowers the mass to a striking extent.

This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tile, wood, brick, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which are forced into an existing mass of rock. Rock-huts and caves have been found in the massive and vast rocks of India deep and spacious gorges, (Fig. 5) one over with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is not solid mass, the remnant of the natural rock left after leaving. These caves, which are in the main shaped by the hand of man, are the outcome of the struggle, so to speak, between the principle of natural mass itself and that of space created by the dismantling of existing mass. In other countries, though to a lesser extent than in India, more or less regular caves were also hewn out, or actually carved out of rock. The spirit of hewing out of rock is also seen in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression.

There were the good the public buildings. Through the experience of the years of history, we come to building houses of worship. The idea is power of culture expressed itself in building distinguished for their size and beauty and their artistic perfection. The increasing demands of knowledge, science, agriculture, commerce of various kinds, industry, commerce and law, transport, entertainment, sport, etc. led to different kinds of buildings. Buildings, as they developed, became especially rich sources of forms creating architecture.

The purpose of architecture, however, does not yet define the going. We shall come to the understanding of the nature by considering some architectural basic ideas, such as mass and space. Every idea becomes clearer when it appears in its pure state and in contact with other ideas. Even as a creative element is realized almost perfectly in the Egyptian pyramids. Their architecture contained these regular geometric forms or ideas, they left little room only a very small cavity. The pyramids are almost solid bodies, superior to the spirit of sculpture than to that of architecture in the accepted sense. One more applied idea to pre-architectural pyramids in the ancient continent, (Fig. 1) which seem to have been used as bases for artificial altars and astrological observatories. In India a similar type was created. This is the Stupa (Fig. 2) (appearing for the first time in the middle of the 3rd century B.C.) which is designated in Sanskrit and can be likened to an architectural water-tower. It grows and evolves, and in, in India, the symbol of the universal, eternal being. The Stupa is devoid of openings and internal spaces, and contains only a small hole in which are placed relics of the Buddha. In India, Stupa came under other forms, ideas to tower. In the island of Java, through the efforts of early practitioners, the richest and most complicated form of Stupa was created. These represented the most highly developed form of Stupa. In contrast to this complex, which contains a number of external and a number of spaces, let us consider, for example, the Church of St. Sophia in Constantinople (Fig. 4) (5th century), and the splendid mosque built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being left and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, in which the vaults are suspended, is reduced to a supporting structure. Here the space represents the main to a striking extent.

The first architectural mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to the accepted definition, building is the joining of parts of different materials - stone, tiles, wood, iron, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular large which are devoid of internal space. But, as we know, in all known, whether solid buildings or those constructed for internal space, there is not another class of buildings which is not "built" at all. There are the rooms which are formed into an existing mass of walls. Windows and doors formed out of the masonry and vast rooms of India deep and spacious rooms, (Fig. 5) were even with several floors, and under the other. The pillars in these rooms are not pillars in the true sense, because the whole is one solid mass, the removal of the central rods left after boring. These rooms, which are in the main shaped by the load of roof, are the essence of the vault, so to speak, between the principles of external mass itself and that of space created by the distribution of existing mass. In other countries, though to a lesser extent than in India, more or less regular rooms were also born out, as existing space enlarged. The spirit of leaving out of rock is also aimed to build houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression.

In the continuation of this architectural tendency, however, in which space was victorious over existing mass, mass again becomes dominant. In Southern India, (fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-masons, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the "houses" and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle of monolithic buildings is realized to a more limited extent.

Now that we have considered these phenomena, which considerably enlarge the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of masses, i.e. of closed solids; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic animation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the Romanesque churches of Western and Central Europe. The main body of the Roman Pantheon, (fig. 7) or the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. Very many of the gigantic buildings in modern America (fig. 8) also belong to this category. Their mighty masses are at times shaped with an almost musical rhythm, with reciprocating connections, with harmony between parts and with descending movements within a general ascending motion. In the opposing system a differentiation in construction is developed. The most characteristic parts of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing but partitions which enclose the interior. In Ancient Greece (fig. 9) these partitions were placed inside the columns, and in the Far East (fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Entire bundles of columns rise up inside the building (fig. 11) and their capitals do not interrupt the soaring motion, but act as a kind of springboard projecting the motion into the ribs of the vaults. The segments which are spanned across the ribs are mainly "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (fig. 12), which run alongside the aisles the whole length of the building. Above the side aisles flying buttresses project from the height of the nave and transfer a considerable part of the thrust of its vault onto the external vertical buttresses.

This system of construction necessarily leads us to aesthetic categories proper. These are primarily based on the properties of the materials used. Let us recall the Babylonian and Assyrian buildings (fig. 13) in which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich quarries of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring works, the materials found in the countries around the Tigris and the Euphrates were in the main clay or lime, which, even when rammed, is unable to resist the force of rain water for a long time. A certain measure of preservation was afforded by air-dried bricks. Better bricks were obtained by firing and additional strength was given to the surface by glazing.

In the continuation of this architectural tendency, however, in which space was victorious over existing mass, mass again becomes dominant. In Southern India, (fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-layers, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the "houses" and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle of monolithic buildings is realized to a more limited extent.

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In the continuation of this architectural tendency, however, in which space was victorious over enclosing mass, was again borrowed Semitic. In South-west India, (fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-hammers, masons and sculptors into the form of leaves. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the visitors penetrated into the "harem" and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle of uncolithic buildings is realized to a very limited extent.

Now that we have considered these phenomena, which considerably enlarge the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of mass, i.e. of closed solids; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic animation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the Renaissance churches of Western and Central Europe. The main body of the Roman Pantheon, (fig. 7) or the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. Very many of the gigantic buildings in modern America (fig. 8) also belong to this category. Their mighty masses are at times played with an almost musical rhythm, with reciprocating connections, with harmony between parts and with descending movements within a general ascending motion. In the opening system a differentiation in construction is developed. The most characteristic parts of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing but partitions which enclose the interior. In ancient Greece (fig. 9) these partitions were placed inside the columns, and in the Far East (fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Entire bundles of columns rise up inside the building (fig. 11) and their capitals do not interrupt the soaring motion, but act as a kind of spring-board projecting the motion into the ribs of the vaults. The segments which are spanned across the ribs are mainly "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (fig. 12), which run alongside the sides the whole length of the building. Above the side aisles flying buttresses project free the height of the nave and transfer a considerable part of the thrust of the vault onto the external vertical buttresses.

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In the continuation of this architectural tendency, however, in which space was victorious over enclosing walls, there again became dominant. In North-east India, (fig. 6) for example, a series of chambers was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-carvers, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the "houses" and created rooms. Outside India, e.g., in the vicinity of Jerusalem, this principle of monolithic buildings is realized to a more limited extent.

As that we have considered these phenomena, which considerably enlarge the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of mass, i.e. of glacial walls; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic mitigation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the Renaissance churches of Western and Central Europe. The main body of the House of David, (fig. 7) as the Palace of David (early Renaissance period), are classic examples of this kind of creation. Very many of the gigantic buildings in colonial America (fig. 8) also belong to this category. Their mighty masses are at times shaped with an almost musical rhythm, with receding and advancing, with heavy lower parts and with diminishing elements within a general ascending motion. In the opposing system a differentiation in construction is developed. The most characteristic parts of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing but partitions which enclose the interior. In ancient Greece (fig. 9) these partitions were placed inside the columns, and in the far East (fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Gothic buildings of columns rise up inside the building (fig. 11) and their capitals do not interrupt the soaring motion, but act as a kind of spring-board projecting the motion into the ribs of the vaults. The segments which are spaced across the ribs are usually "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of ceilings, vaults and domes, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (fig. 12), which run alongside the whole the whole length of the building. These the side pillars flying buttresses project from the height of the nave and transfer a considerable part of the thrust of the vault onto the external vertical buttresses.

This system of construction necessarily leads us to aesthetic constructive aspects. These are primarily based on the properties of the materials used. Let us recall the Indian and American buildings (fig. 13) in which the volume of the walls merges into the side of the room. This strange closeness of the walls is the logical outcome of the use of inferior materials. While the rich countries of the country of the Nile gave to Egyptian architecture splendid possibilities for enclosing walls, the materials found in the countries around the equator and the tropics were in the main clay or lime, which, even when dried, is unable to resist the force of rain water for a long time. A certain measure of preservation was afforded by ear-baked bricks. Better bricks were obtained by firing and additional strength was given to the surface by glazing.

In the realization of this architectural tendency, however, on which Egypt was victorious over building mass, mass again becomes dominant. In Northern India, (Fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by glass-blowers, masses was produced into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the surface penetrated into the "houses" and created rooms. In India, e.g. in the vicinity of Benares, this principle of monolithic buildings is realized to a very limited extent.

Now that we have considered these processes, which considerably change the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its exterior. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of mass, i.e. of closed walls; this illusion remains even after it is softened, or even abolished, by the introduction of openings or other means of outside ventilation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the baroque churches of Western and Central Europe. The main body of the Roman Pantheon, (Fig. 7) or the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. Very many of the plastic buildings in modern America (Fig. 8) also belong to this category. Their solid masses are at times shaped with an almost naked style, with reinforcing members, with heavy column parts and with ascending movements within a general ascending motion. In the Egyptian system a differentiation in construction is developed. The most characteristic parts of the rock or the Chinese house are columns which support the architecture and the roof. The walls are within the partitions which enclose the interior. In ancient Greece (Fig. 9) these partitions were placed inside the columns, and in the Perseus (Fig. 10) they had no partitions within the columns, sometimes behind them or between them. The most daring and imaginative example of differential construction is, without doubt, the Gothic one. Gothic houses of columns rise up inside the building (Fig. 11) and their capitals do not interrupt the ceiling surface, but act as a kind of springboard projecting the ceiling into the side of the vault. The segments which are opened across the side are called "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (Fig. 12), which run alongside the main the whole length of the building. These pillars also flying buttresses project from the height of the mass and transfer a considerable part of the thrust of the vault onto the external vertical buttresses.

This series of construction necessarily leads us to another category proper. These are primarily based on the properties of the materials used. Let us recall the Egyptian and Assyrian buildings (Fig. 13) in which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich resources of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring walls, the materials found in the mountains around the Tiber and the Alps were in the main clay or lime, which, even when burned, is unable to resist the forces of rain water for a long time. A certain measure of preservation was afforded by p.r.-brick walls. Better bricks were obtained by firing and additional strength was given to the surface by glazing.

Though unintentional at first, these technical methods led to aesthetic improvements. Glazing combined with coloring led to variety and enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "facades" - not only Mesopotamia - and they explain the existence of the facade in general, i.e. the embellished face of the house. Only when the material itself is inferior does a technical and aesthetic covering and overlaying become necessary.

For the facade is, in itself and according to its proper nature, a thing untrue, even artificial or fictitious. Only in the most highly developed architecture was the facade also able to become a faithful expression of the interior organization of the house and its structure. Then, however, the material is superior by nature, the need for camouflage does not arise. It will be revealed unadorned, and its appearance alone, in all its naivety, will have artistic value. The Greek house is a good example also of the qualities resulting from the use of superior materials. In modern architecture, or at least in its early stages, an appreciation of the correct use of materials was born anew. The first pioneers in this venture, who wished to do justice to materials, disapproved of imitation, as in reproducing in metal the forms characteristic of wood, or coloring sheets of tin to give the impression of marble. Every material has its own innate property of form, and the modeling of one material according to the properties of another constitutes a falsification. In modern architecture the prevailing tendency is to exhibit and emphasize the nature of steel, concrete, glass, etc. This emphasis became a rich source of beauty.

For the attainment of beauty in architecture, two other courses were followed. One employs a variety of additions and trimmings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the abundance of adornment sometimes conceals the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Basil in Moscow, for instance, the load of ornaments envelops most of the building, and almost hides it from the eye. The towers or cupolas, in their weird multiplicity, no longer serve any use of purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and sculptural expression assumed its most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1550-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a reckless swaying and sea of fantastic projections strangle the fundamental body of the building. Let us again recall the classic creations of Greece, from this viewpoint as well. A simple construction is characteristic of the Greek art of building, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this form of architecture is distinguished by well-conceived proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases the eye and exalts the spirit. Numerous houses in China are also distinguished by this tranquil simplicity. The adornments found in both these countries are not

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For the attainment of beauty in architecture, two other courses were followed. One employs a variety of moldings and trimmings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are designed as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore the abundance of ornament sometimes conceals the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the church flourished. In the Cathedral of Basil in Moscow, for instance, the load of ornaments envelops most of the building, and almost hides it from the eye. The towers or apses, in their varied multiplying, no longer serve any use of purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and sculptural expression assumed its most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1650-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a reckless jangling and sea of fantastic projections strangle the fundamental body of the building. Let us again recall the classical canons of Greece, from this viewpoint as well. A simple construction is characteristic of the Greek art of building, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this form of architecture is distinguished by well-conceived proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases the eye and exalts the spirit. Numerous houses in China are also distinguished by this beautiful simplicity. The advantages found in both these countries are not

Though unintentional at first, these technical methods led to aesthetic improvements. Clinging somewhat with adorning led to variety and enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "façades" - not only facades - and they explain the existence of the facade in general, i.e. the embellished face of the house. Only when the material itself is inferior does a technical and artificial gauding and overlying become necessary.

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For the attainment of beauty in architecture, two other courses were followed. One employs a variety of additions and trappings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the abundance of adornment sometimes covers the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times this prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Saint Isaac in Leningrad, for instance, the load of ornamental envelope most of the building, and almost hides it from the eye. The towers or apses, in their wild exuberance, no longer serve any use of purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and sculptural expression covered the most mature forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1550-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a restless veering and one of fantastic projections strangle the fundamental body of the building. Let us again recall the classic creations of Greece, even this viewpoint as well. A simple construction is characteristic of the Greek art of building, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this form of architecture is distinguished by well-calculated proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases the eye and soothes the spirit. Persian houses in China are also distinguished by this tranquil simplicity. The phenomena found in both these countries are not

These architectural details, these technical details led to aesthetic improvements. Starting with details led to variety and enrichment and to the decoration of the whole with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "facades" - not only facades - and they explain the existence of the facade in general, i.e., the external form of the house. Only when the external itself is intended as a technical and aesthetic apparatus and envelope become necessary.

For the facade is, in itself and according to its proper nature, a thing whose own artificial or artificiality, only in the most highly developed architecture was the facade able to become a faithful expression of the interior organization of the house and its structure. Then, however, the exterior is superior by nature, the need for camouflage does not arise. It will be revealed, and the appearance alone, in all its reality, will have artistic value. The facade house is a good example of the realization resulting from the use of superior materials. In modern architecture, or at least in its early stages, all appreciation of the approach and of materials was lost. The first change in this venture, the wish to be better in material, disappeared of intention, as in reproducing in what the house characteristic of wood, or coloring effects of its to give the impression of wood. Every material has its own innate property of form, and the modeling of one material according to the properties of another constitutes a falsification. In modern architecture the prevailing tendency is to exhibit and emphasize the nature of steel, concrete, glass, etc. This exhibits before a rich source of beauty.

For the attainment of beauty in architecture, the other means were followed. One employs a variety of additions and techniques, and in various degrees the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the demands of adornment sometimes caused the body of the house and its details attention from it. Ornamentation with its taste and imagination frequently increased at the expense of pure architecture. At times it even prevailed also in the houses of building, particularly during the periods when the church flourished. In the decoration of walls in wood, for instance, the kind of ornamental covering most of the building, and almost like to close the eye. The house is covered, in their varied individuality, no longer serve any real purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and polygraphical expression caused the most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the baroque period, (fig. 15) about 1600-1750. The use of straight lines, which are the decisive factors of pure architecture, is restricted in character and placed in this style. Surfaces and a restless moving and set of fantastic projections through the finished body of the building. Let us again recall the classic questions of Greek, how this viewpoint is well. A single construction is characteristic of the Greek art of building, and is in this simplicity which gives the impression of noble perfection. Together with the effects of the architectural proper, this form of architecture is distinguished by well-considered proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the parts, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases the eye and unites the whole. Numerous houses in China are also distinguished by their simple simplicity. The decorative found in with their American are not

arbitrary additions. In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction when it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly upswapt lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: The system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged. The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture. The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamics, a form approaching organic life. In opposition to this, the Egyptian Pyramid, for example, expresses the quiescent form, eternal existence, statics and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquility, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of greatness and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and

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arbitrary additions. In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been affected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction when it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a mass of a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly vertical lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: The system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged. The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture. The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamics, a form approaching organic life. In opposition to this, the Egyptian pyramid, for example, expresses the quiescent form, eternal existence, static and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquillity, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of grandeur and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and

arbitrary additions. In the spirit of pure mathematics they proceed from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can mar the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction when it is distinguished by logical and constructive reciprocity in its measurements. Even this is desired the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly upright lines. We shall not consider here the origin of this verticality. We shall assume this phenomenon only from the point of view of the effect upon the spectator: the system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and toward the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged. The distinctive principle in these Indian structures, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and uncontrolled movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture. The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamism, a form approaching organic life. In opposition to this, the Egyptian pyramid, for example, expresses the opposite form, eternal existence, stasis and incorruptible being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiple lines of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which expresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of equilibrium, an expression of tranquillity, security and repose. We have an exact idea of the aesthetic impressions made by the early Mesopotamian architecture in the original state, and we can only imagine that the composition of horizontal and vertical stripes and lines gave the impression of a striving for authority and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of grandeur and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is how the cupolas built in Baghdad or in similar shapes. The most perfect examples of round, Byzantine and

arbitrary additions. In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction when it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly upward lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: the system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged. The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture. The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamic, a form approaching organic life. In opposition to this, the Egyptian pyramid, for example, expresses the quiescent form, eternal existence, static and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquillity, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of greatness and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and

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Domestic architecture evokes in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religious and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of Occidentals. This rather more Eastern principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, firm and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot classify this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and perfected. The Taj Mahal mausoleum (fig. 20), which was built in the 17th Century near Agra in India by one of the Mughal Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾. In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalise rulers

2) In connection with this masterpiece, let us mention garden architecture in general and, in particular, three of its main styles. The Chinese garden is concentrated nature, reflecting its rich variety in miniature; the Persian garden is further removed from the natural state of the landscape and it; the French garden, particularly since the gardens of Versailles, introduces into the landscape artificial forms, foreign to nature, yet the result is superb due to the vast amount of planning put into its creation.

Japanese architecture exists in its own feelings.

However, the aesthetic values discussed so far concern only the features of the building itself and its surroundings. The relations which exist between the building and its surroundings is not the least essential of these values. In our native buildings (Fig. 11), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. These relationships follow nature, the building becoming the line of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religions and philosophical schools of China. According to this conception, the universe is the realm, the domain of the "Heavenly Principle" and "Heavenly Power", earth and man. Man, who is only the child of these three elementary forces, depends totally on the other two. He adapts himself man and man to nature, to its order and periods, and moulds his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Harmonization" - the absorbing other large dimensions and the appearance of light and colours - is designed to harmonize with the landscape. There are no gigantic buildings, only regular and symmetrical multiplications of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "ch'i and shen") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with most nature, especially in the case of Occidentals. This rather more complex principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to impose its form, to be visible as a great object, to stand out and make the world around it. The castles (Fig. 12) which were built in Europe in the Middle Ages were really built, first and foremost, in this spirit. There are also in this category, however, conditions of friendly appearance. The main feature of these buildings is that they dominate and make their surroundings. In recent times this domination is purely negative.

This form of architecture also provides the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative freedom when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this attitude is developed and perfected. The Val Viall residence (Fig. 20), which was built in the 17th century near Lake de Bulla is one of the finest examples. For his wife who had died at a precociously early age, he was visited by night, and the surrounding landscape is transformed into one vast garden. In this architectural category - the striving for domination over nature, let us again take up the idea of "harmonization" and its meaning. It was the tendency to harmonize with

- 2) In connection with this category, let us mention garden architecture in general and, in particular, types of its main styles. The Chinese garden is concentrated nature, reflecting the rich variety in miniature; the Japanese garden is further removed from the natural state of the landscape (Fig. 14); the French garden, particularly since the garden of Versailles, introduced into the landscape artificial forms, foreign to nature, but the result is more due to the best result of planting put into its creation.

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Renaissance architecture evokes in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religious and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of Occidentals. This rather more Western principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, firm and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and perfected. The Taj Mahal mausoleum (fig. 20), which was built in the 17th Century near Agra in India by one of the Moslem Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾. In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalize rulers

2) In connection with this masterpiece, let us mention garden architecture in general and, in particular, three of its main styles. The Chinese garden is concentrated nature, reflecting its rich variety in miniature; the Persian garden is further removed from the natural state of the landscape and it; the French garden, particularly since the gardens of Versailles, introduces into the landscape artificial forms, foreign to nature, yet the result is superb due to the vast amount of planning put into its creation.

landscape architecture evolves in on such feelings.

Moreover, the aesthetic values discussed so far concern only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. Human achievements follow nature, the building ensuring the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religious and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Immanence" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of occidentals. This rather more Western principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, firm and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and perfected. The Taj Mahal mausoleum (fig. 20), which was built in the 17th century near Agra in India by one of the Mughal emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾. In this architectural category - the striving for domination over nature, let us again take up the idea of "immanence" and its meaning. It was the tendency to imitate the rulers

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Residence architecture evokes in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as perfectly as possible and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religious and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of Occidentals. This rather more Western principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, firm and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative.

This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and perfected. The Taj Mahal mausoleum (fig. 20), which was built in the 17th Century near Agra in India by one of the Moslem Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾. In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalize rulers

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and ruling social groups which originally led to the creation of solemn and enduring architectural forms, which evoked in the onlooker a feeling of his smallness. With the best types of monumental building, however, he is not left with a feeling of abandonment, but is finally uplifted. The greatness radiating from these buildings awakens in him a feeling of awe and reverence. He will indeed feel smaller, so to speak, and bow his head, but together with this feeling of reverence, and in spite of it, he will experience a deep and unique feeling of happiness. This psychological reaction could perhaps be explained as a kind of sharing in the creation.

The majority of architectural constructions were created anonymously. Most of the creators therefore worked for the love of the work itself and dedicated their lives to it. But still more worthy of our admiration are whole generations who sacrificed themselves to these creations, knowing that they had no hope of seeing their labour completed or enjoying its fruits. This heroism can be understood only by the force of great ideas which inspired these generations to the point of self-sacrifice. This is a moral lesson which architecture teaches.

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The majority of architectural constructions were created anonymously. Most of the creators therefore worked for the love of the work itself and dedicated their lives to it. But still more worthy of our admiration are whole generations who sacrificed themselves to these creations, knowing that they had no hope of seeing their labour completed or enjoying its fruits. This decision can be understood only by the force of great ideas which inspired these generations to the point of self-sacrifice. This is a moral lesson which architecture teaches.

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and selling world peace which originally led to the creation of nations and modern architectural forms, which ended in the collapse and feeling of his disillusion. With the last types of commercial building, however, he is not left with a feeling of abandonment, but is finally satisfied. The pleasure resulting from these buildings comes in with a feeling of one who has reached a goal. He will indeed feel better, as he goes, and has his hand, but together with this feeling of achievement, and in spite of it, he will experience a deep and subtle feeling of loneliness. This psychological reaction could perhaps be explained as a kind of sharing in the creation.

The majority of architectural practitioners were contented respectively. Each of the smaller members worked for the love of his work itself and dedicated their lives to it. But still more worthy of our admiration are those generations who sacrificed themselves to their work, knowing that they had no hope of seeing their labor completed or enjoying the fruits. This feeling can be understood only by the force of great ideas which inspired these generations to the point of self-sacrifice. This is a great lesson which architecture teaches.

What is Architecture?

Since its inception, architecture has occupied a focal position in the study of aesthetics; in particular, architects have advanced theories on architecture in general, and on its nature.¹⁾ But all these outstanding authors, and those who

1) The first master in the aesthetics of architecture, and the teacher of many generations following him, was the Roman Vitruvius. It is not known for certain when he lived, but we surmise it was in the first century B.C.. The greatest of his followers was the Italian architect and author, Leon Battista Alberti (d.1472). After him came Sebastiano Serlio (d. 1552), Giacomo Barozzi da Vignola (1507 - 1573), Andrea Palladio (1518 - 1580), the outstanding architectural theorist and creator of a notable school of architecture, and, finally, Vincenzo Scamozzi (d. 1616). In France the most noteworthy thinkers and creators in the art of building were Philibert de l'Orme (d. 1570), Jean Bullant (d. 1578), Jacques Androuet du Cerceau (about the same period), François Blondel (d.1686). In England, in the 18th Century, Colin Campbell (d.1734) and William Adam (d. 1748) rose to fame.

followed them, were Europeans. ~~In spite of the depth of their writings, it seemed that~~ they were not acquainted with the architecture which existed outside their civilization. All their ideas, and the laws which they formulated, were therefore based on too limited empirical foundations. In the light of the latest scientific achievements, it becomes clear that they did not reach the generality and objectivity at which they had aimed, and which are justified only by universal applicability. Let us try to understand the fundamentals of architecture, not according to styles, because these are the results of historical development, but according to basic principles and original forces which can assume the forms that become, under suitable conditions, what we call styles.

The roots of architecture lie in the material world, in the practical world of man and society, while the summit stretches upwards, into the world of spirit and beauty.

The dwellings of primeval man were, it seems, caves and places with improvised natural cover. The magnificent paintings in the caves, preserved from the Early Stone Age, indicate that wild men dwelt in them. ~~P.T.O.~~

They hunted for their food and waged a ceaseless aggressive and defensive war against the wild animals. The brutal conditions under which they lived forced them to develop a keen sense of observation of their surroundings and an almost infallible sense of perception, which expressed itself in the form of these wall paintings, the very earliest known. However, whatever has remained of early man's proper building is a survival only of the Neolithic Age. In this age men organised themselves into groups, larger than families, and the centre of growth of their economy shifted from hunting to the tilling of the land and the raising of cattle. These new conditions blunted their faculty of quick observation and strengthened in them different aspects of artistic skill. In the course of his observing the revolutions of the sun, the moon and the stars, and their cycles according to the seasons of the year, there is awakened in the peasant the feeling for law and order, the feeling for, and the appreciation of, rhythm. The man of the New Stone Age was less skilled in his attempts to imitate nature and to depict the phenomena of the living world. But at the same time he learned to express by other means his innermost thoughts and his conception of the universe, and his impressions of ^{his} surroundings and his daily life. The means of his artistic expression are patterns symbolizing his impressions and thoughts, signs drawn in regular and recurring form - ornaments. In that period only, man became capable of building. The remains of buildings of Neolithic Man show a surprising similarity to the buildings of some contemporary wild tribes. This analogy supplements our knowledge of pre-historic buildings. Both in Neolithic building and in that of contemporary savage tribes corresponding to this evolutionary stage, there are houses built on piles, (fig. 1), standing both in water and on dry land; both types were for defence against wild beasts and the enemies of man. From the common features of the pre-historic buildings and the buildings of primitive tribes, we may conclude that the primary purpose of architecture is, in general, that of shelter and defence. To this basic aim of architecture there were added, in the course of the evolution of human needs, many other aims. Besides houses built for the living, tombs were built in the Neolithic Age, and they testified to the early realization of man's connection with death and conception of religious ideas. With the

growth of the social group from the first cell, the family, to larger groups, there arose the need for public buildings. Through his veneration of the forces of nature, man came to build houses of worship. The rise to power of rulers expressed itself in buildings distinguished for their size and strength and their aesthetic perfection. The increasing demands of developing human civilization—crafts of various kinds, industry, commerce and law, transport, entertainment, sport, etc.—*led to different kinds of buildings.* Religions, as they developed, became especially rich sources of forces creating architecture.

The purpose of architecture, however, does not yet define its nature. We shall come to the understanding of its nature by considering some antithetical basic ideas, such as mass and space. Every idea becomes clearer when it appears in its pure state and is not mixed with other ideas. Mass as a creative element is realized almost perfectly in the Egyptian Pyramids. When their constructors amassed these regular gigantic heaps or piles, they left inside them only a very small cavity. The Pyramids are almost solid bodies, nearer to the spirit of sculpture than to that of architecture in its accepted sense. The same applies also to pre-Columbian pyramids on the American continent, (fig. 2) which seem to have been used as bases for sacrificial altars and astrological stations. In India a similar type was created. This is the Stupa (fig. 3) (appearing for the first time in the middle of the 3rd Century B.C.) which is hemispherical in form and can be likened to an evanescent water-bubble. It grows and vanishes, and is, in India, the symbol of its contrast, eternal being. The Stupa is devoid of openings and internal spaces, and contains only minute boxes in which are stored relics of the Buddha. In Indo-China, Stupas assume other forms, closer to towers. In the island of Java, through the efforts of many generations, the richest and most complicated form of stupa was created. These represented the most highly developed form of stupa. In contrast to this category, which contains a maximum of material and a minimum of space, let us consider, for example, the Church of St. Sophia in Constantinople (fig. 4) (6th Century), and the splendid mosques built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being lofty and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, on

which the vaults are suspended, is reduced to a surprising minimum. Here the space overpowers the mass to a striking extent.

This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tiles, wood, iron, concrete, glass, etc., - into units generally called houses. This conventional definition can also be applied to regular heaps which are devoid of internal space. But, in contrast to all houses, whether solid buildings or those constructed for internal space, there is yet another class of buildings which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious caves, (fig. 5) some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, the remnant of the natural rock left after hewing. These caves, which are in the main shaped by the hand of man, are the outcome of the wrestle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. In other countries, though to a lesser extent, than in India, more or less regular caves were also hewn out, or existing caves enlarged. The spirit of hewing out of rock is also sensed in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression.

new paragraph In the continuation of this architectural tendency, however, in which space was victorious over existing mass, mass again becomes dominant. In Southern India, (fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This solid mass was shaped by stone-hewers, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the "houses" and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle of monolithic

buildings is realized to a more limited extent.

Now that we have considered these phenomena, which considerably enlarge the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with solid walls, buildings produce the optical illusion of masses, i.e. of closed solids; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic animation such as projections and indentations. This principle is followed in the majority of buildings, from ancient Mesopotamia to the Romanesque churches of Western and Central Europe.

The main body of the Roman Pantheon, (fig. 7) or the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. Very many of the gigantic buildings in modern America (fig. 8) also belong to this category. Their mighty masses are at times shaped with an almost musical rhythm, with reciprocating connections, with harmony between parts and with descending movements within a general ascending motion. In the opposing system a differentiation in construction is developed. The most characteristic parts of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing but partitions which enclose the interior. In Ancient Greece (fig. 9) these partitions were placed inside the columns, and in the Far East (fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Entire bundles of columns rise up inside the building (fig. 11) and their capitals do not interrupt the soaring motion, but act as a kind of springboard projecting the motion into the ribs of the vaults. The segments which are spanned across the ribs are mainly "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, of a size hitherto unknown. Apart from the system of internal pillars, there is a second system of external pillars called buttresses (fig. 12), which run alongside the aisles the whole length of the building.

Above the side aisles flying buttresses project from the height of the nave and transfer a considerable part of the thrust of its vault onto the external vertical buttresses.

This system of construction necessarily leads us to aesthetic categories proper. These are primarily based on the properties of the materials used. Let us recall the Babylonian and Assyrian buildings (fig. 13)ⁱⁿ which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich quarries of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring works, the materials found in the countries around the Euphrates and the Tigris were in the main clay or lime, which, even when rammed, is unable to resist the force of rain water for a long time. A certain measure of preservation was afforded by air-dried bricks. Better bricks were obtained by firing and additional strength was given to the surfaces by glazing. Though unintentional at first, these technical methods lead to aesthetic improvements. Glazing combined with coloring led to variety and enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up by projecting and receding parts. Conditions such as these gave rise to "facades" - not only in Mesopotamia - and they explain the existence of the facade in general, i.e. the embellished face of the house. Only when the material itself is inferior does a technical and aesthetic covering and overlaying become necessary.

For the facade is, in itself and according to its proper nature, a thing untrue, even artificial or fictitious. Only in the most highly developed architecture was the facade also able to become a faithful expression of the interior organization of the house and its structure. When, however, the material is superior by nature, the need for camouflage does not arise. It will be revealed unadorned, and its appearance alone, in all its naivety, will have artistic value. The Greek house is a good example also of the qualities resulting from the use of superior materials. In modern architecture, or at least in its early stages, an appreciation of the correct use of materials was born anew. The first pioneers in this venture, who wished to do justice to materials, disapproved of imitation, as in reproducing in metal^{the} forms characteristic of wood, or coloring

sheets of tin to give the impression of marble. Every material has its own innate property of form, and the modeling of one material according to the properties of another constitutes a falsification. In modern architecture, ^{the} prevailing ~~the~~ tendency is to exhibit and emphasize the nature of steel, concrete, glass, etc.,. This emphasis became a rich source of beauty. new paragraph For the attainment of beauty in architecture, two other courses were followed. One employs a variety of additions and trimmings, and in extreme instances the influence of the decorative crafts, painting and sculpture is evident. Such buildings are arranged as if their main intention was to impress the eye in the manner of painting. In some styles of Islamic architecture (fig. 14) houses were built with the clear intention of appearing like pictures. Furthermore, the abundance of adornment sometimes conceals the body of the house and distracts attention from it. Ornamentation rich in taste and imagination frequently increased at the expense of pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Basil in Moscow, for instance, the load of ornaments envelops most of the building, and almost hides it from the eye. The towers or cupolas, in their weird multiplicity, no longer serve any use or purpose, and are there for the sake of the pictorial impression only. The desire for pictorial and sculptural expression assumed its most bizarre forms in European architecture (particularly in Italy, Spain and Germany) in the Baroque period, (fig. 15) about 1550-1750. The use of straight lines, which are the decisive features of pure architecture, is restricted in churches and palaces in this style. Curves and a reckless swaying and sea of fantastic projections strangle the fundamental body of the building. Let us again recall the classic creations of Greece, from this view point as well. A simple construction is characteristic of the Greek art of ~~building~~ ^{form of architecture}, and it is this simplicity which gives the impression of noble perfection. Together with the effects of the material proper, this ~~material~~ ^{form of architecture} is distinguished by well-conceived proportions based on comprehensive and logical mathematical calculations. The relations between the overall height and breadth, between the whole and the ~~parts~~, and between the parts themselves, are precisely planned and lead to the perfect harmony which so pleases

the eye and exalts the spirit. Numerous houses in China are also distinguished by this tranquil simplicity. The adornments found in both these countries are not arbitrary additions.

In the spirit of pure architecture they result from the type of material used and from structural principles. In modern architecture the idea of reaching aesthetic perfection by proper reciprocal relations between all the measurements of a house, has long been accepted, but has been effected in a small degree only. Just as a petty error or slight negligence can endanger the general impression, so an architectural creation, even a simple and modest one, gives us deep satisfaction ^{when} ~~then~~ it is distinguished by logical and systematic reciprocity in its measurements. From this is derived the pleasure sometimes given us by the exterior and interior of a house which may be only a cube or a composition of elementary geometrical bodies.

We have already made some mention of the visual and psychological effect of lines or directions in the appearance of buildings. The example which has long been popular is the Gothic style with its predominantly upswept lines. We shall not consider here the origin of this verticalism. We shall examine this phenomenon only from the point of view of the effect upon the spectator: The system of pillars, joined together in pointed arches at a great height, tends to exalt, to lift the mind from the material world and awaken the spiritual side. One of the Indian styles is, in certain aspects, close to the Gothic. This too is full of movement, and in it one direction prevails according to which all the lines are arranged.

The distinctive principle in these Indian sanctuaries, however, is the horizontal tendency (fig. 16). The houses are built of layers of stone which are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers to the required height. The European baroque style, despite its irregularity and unrestrained movement, shows also certain dominant principles of movement, such as the diagonal. Just as the vertical line elevates, and the multiplied horizontal line moves the spirit and sends it to the remote, so the diagonal line excites the spectator and arouses in him feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it dominates the other dimensions. This direction is particularly noticeable in English architecture.

The movement of the spectator himself in these mighty buildings adds to the dynamic impression created by their great length. The common features of these styles are, therefore, an expression of movement, a play of forces, action, dynamics, a form approaching organic life. In opposition to this, the Egyptian Pyramid, for example, expresses the quiescent form, eternal existence, statics, and inorganic being. To some extent any horizontal line may be considered as static - in so far as the static state is not abolished by the multiplication of horizontal lines. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and of all periods of its revival. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which suppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquility, security and repose. We have no clear idea of the aesthetic impressions made by the early Mesopotamian architecture in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a striving for austerity and solemnity. This was perhaps also the general appearance of Solomon's Temple, about which we have so much information from biblical sources, but without any knowledge of its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. - A liberation of spiritual forces, or the arousing of feelings of greatness and harmony, was at all times the psychological effect of all kinds of arches (fig. 17); this is true of cupolas built in hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and Renaissance architecture evoke in us such feelings.

However, the aesthetic values discussed so far embrace only the features of the building itself and its appearance. The relation which exists between the building and its surroundings is not the least essential of these values. In Far-Eastern buildings (fig. 18), for instance, in both single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform to them as

perfectly as possible, and grow out of them. Human achievements follow nature, the building assuming the lines of the landscape which is in turn itself reflected in the house. This relationship can be explained by a conception of the universe common to all the religions and philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the third of these three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periods, and models his life on that of the universe, so he achieves moral perfection and happiness. In a Chinese or Japanese building, therefore, the tendency seems to be to merge into the landscape rather than to rise above it. "Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not altogether depend on the taste of the individual architect, but is an age-old traditional system (called by the Chinese "winds and water") which regulates this adaptation in all its details. The principle contrary to that prevailing in China is more widely spread throughout the world, because it is more in keeping with human nature, especially in the case of Occidentals. This rather more Western principle arises from the desire to make the building dominate its surroundings. The house, so to speak, strives to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. The castles (fig. 19) which were built in Europe in the Middle Ages were mostly bold, grim and unyielding in aspect. There are also in this category, however, creations of friendly appearance. The main feature of these buildings is that they dominate and subdue their surroundings. We cannot dismiss this domination as purely negative. >

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(This form of architecture also permits the taking into account of existing conditions and the nature of the landscape, by means of a more or less sensitive reaction to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by producing an impression, but by actual use and shaping of the surroundings. By laying out gardens around the building, which prepare the spectator for the building itself, this principle is developed and

perfected. The Taj Mahal mausoleum (fig.20), which was built in the 17th Century near Agra in India by one of the Moslem Emperors, for his wife who had died at a prematurely early age, is a vision in white marble, and the surrounding landscape is transformed into one vast garden²⁾

2) In connection with this masterpiece, let us mention garden architecture in general and, in particular, three of its main styles. The Chinese garden is concentrated nature, reflecting its rich variety in miniature; the Persian garden is further removed from the natural state of the landscape and stylizes it; the French garden, particularly since the gardens of Versailles, introduces into the landscape artificial forms, foreign to nature, yet the result is superb due to the vast amount of planning put into its creation.

In this architectural category - the striving for domination over nature, let us again take up the idea of "monumentality" and its meaning. It was the tendency to immortalize rulers and ruling social groups which originally led to the creation of solemn and enduring architectural forms, which evoked in the onlooker a feeling of his smallness. With the best types of monumental building, however, he is not left with a feeling of abandonment, but is finally uplifted. The greatness radiating from these buildings awakens in him a feeling of awe and reverence. He will indeed feel smaller, so to speak, and bow his head, but together with this feeling of reverence, and in spite of it, he will experience a deep and unique feeling of happiness. This psychological reaction could perhaps be explained as a kind of sharing in the creation.

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point of self-sacrifice. This is a moral lesson which architecture teaches.

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Dr. Neftali (Otto) Schneid :

What is Architecture?

the introduction to
The following article is an extract from a book which has recently been completed by our teacher of the History of Architecture and Art. We publish this introductory chapter in order to give our readers some information on the manner in which we teach the History of Architecture.

Note on the history of the research carried out in this subject.

Since its inception, architecture has occupied a focal position in the study of aesthetics; in particular, architects have advanced theories on architecture in general, and on its nature¹⁾. But all these outstanding authors, and those who

retix
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followed them, were Europeans. In spite of the depth of their writings, it seemed that they were not acquainted with the architecture which existed outside their civilization. All their ideas, and the laws which they formulated, were therefore based on too limited empirical foundations. In the light of the latest scientific achievements, it becomes clear that they did not reach

the generality and objectivity at which they had aimed, and which are justified only by universal applicability. We will now try to understand the fundamentals of architecture, not according to styles, because these are the results of historical development, but according to basic principles and original forces which will assume a form, the shapes of which, in corresponding conditions, we call styles. $\leftarrow \rightarrow \sqrt{\quad}$ The roots of architecture lie in the material world, in the practical world of man and society, while the summit stretches upwards, into the world of ~~the spirit concerned with the~~ ^{and} pursuit of beauty.

The dwellings of primeval man were, it seems, caves and places with improvised natural cover. The magnificent paintings in the caves, preserved from the Early Stone Age, indicate that wild men dwelt in them. They hunted for their food and waged a ceaseless aggressive and defensive war against the wild animals. The brutal conditions under which they lived forced them to develop a keen sense of observation in their surroundings and an almost infallible sense of perception, which expressed itself in the form of these wall paintings, indeed the earliest known. However, whatever remains of man's practical building is a survival only of the Neolithic Age. In this age men organised themselves into groups, larger than families, and the centre of growth of their economy shifted from hunting to the tilling of the land and the raising of cattle. These new conditions impaired their faculty of quick observation and strengthened in them other aspects of artistic skill. In the course of ^{his} ~~their~~ observing the revolutions of the sun, the moon and the stars, and their cycles according to the seasons of the year, there is awakened in the peasant the feeling for order, and

periodicity, obeying laws, the feeling for, and the appreciation of rhythm. The man of the New Stone Age, ~~Neolithic Man~~, is less skilled in his attempts to imitate nature and to depict the phenomena of the living world. But at the same time he learned to give expression by other means to his innermost meditations and to the elements of the universe, and thus to his surroundings and his daily life. The fruits of his artistic expression are ornaments, symbols of his impressions and thoughts, signs drawn in regular and recurring form. Thus man of that period only was able to build. The remains of buildings of Neolithic Man show a surprising similarity to those buildings of some of the contemporary wild tribes. This analogy fulfills our knowledge of pre-historic buildings. Both in Neolithic buildings and in those of contemporary wild tribes corresponding to this evolutionary scale, there are houses built on piles, ^(fig. 1) standing both in water and on dry land; both types were for defence against wild beasts and the enemies of man. From the common purpose of both the pre-historic buildings and the buildings of primitive tribes, we may conclude that their primary aim of architecture is, in general, that of protection and defence. To this basic aim of architecture there was added, in the course of the evolution of human needs, many other aims. Besides houses built for the living, graves were also built in the Neolithic Age, and they were witnesses of the first realization of man's connection with death, and of his first conception of religious ideas. With the growth of the social group from the first cell, the family, to larger groups, there arose the need for public buildings. Through his adoration of the forces

of nature, man came to build houses of worship. The rise to power of rulers expressed itself in buildings distinguished for their size and fortifications and their aesthetic perfection. The increasing demands of developing human civilization led to different kinds of buildings - industry, crafts of various kinds, commerce and law, transport, entertainment, sport, etc.. In the development of religions especially, there were rich sources of forces creating architecture.

The aim of architecture, however, does not yet define its nature.
We shall come to ^{the} understanding of its nature by considering some antithetical basic ideas, such as mass and space. Every idea becomes clearer when it appears in its pure state and is not mixed with other ideas. Mass in its creative function is realized almost perfectly in the Egyptian Pyramids. When their constructo^rs piled up these regular gigantic heaps, they left inside them only a very small cavity. The Pyramids are almost solid bodies, nearer to the spirit of sculpture than to that of architecture in its accepted sense. The same applies also to pre-Columbus^{ian} pyramids on the American continent, ^(fig. 2) and they seem to have been used as bases for sacrificial altars and astrological ^(fig. 3) stations. In India a similar type was created. This is the Stoopas (which appeared for the first time in the middle of the 3rdrd Century B.C.) which is hemispherical in form and can be likened to an evanescent water-bubble. It grows and vanishes, and is, in India, the symbol of its contrast, eternal being. The Stoopas is devoid of openings and internal spaces, and contains only minute boxes in which are stored relics of the Buddha. In Indo-China, Stoopas assume other forms, closer to towers. In the island of Java, through the efforts of many generations, the richest and most complicated form of stoopas was built. These represented the most highly developed form of stoopa.

In contrast to this category, which contains a maximum of material and a minimum of space, we must remember, for example, the Church of St. Sophia in Constantinople (6th, Century ^(fig. 4)) and the splendid mosques built, after this model, by the Turks after their conquest of the Byzantine Empire. These buildings are spacious and rich in openings, the space being lofty and large and growing harmoniously in all directions. The whole volume of pillars, columns and walls, on which the vaults are suspended, is reduced to a surprising minimum. Here the space overpowers the mass ^{to extent} in a striking ~~XXXXXX~~.

This first antithesis, mass and space, which we have considered, leads us to a second one through which we approach the question of the method of building. According to its accepted definition, building is the joining of parts of different materials - stone, tiles, wood, iron, concrete, glass, etc., - to units generally called houses. This conventional definition can also be applied to ^{the} regular heaps which are devoid of internal space. But, in contrast to all houses, both the solid buildings and those constructed for internal space, there is yet another class of building ^(s) which is not "built" at all. These are the rooms which man forced into an existing mass of rocks. Buddhists and Hindus hewed out of the massive and vast rocks of India deep and spacious ^(fig. 5) caves, some even with several floors, one below the other. The pillars in these caves are not pillars in the true sense, because the whole is one solid mass, part of it hewn out of the rock and the rest remaining in its natural state. These caves, which are in the main shaped by the hand of man, are the outcome of the wrestle, so to speak, between the principle of natural mass itself and that of space created by the diminishing of existing mass. As mentioned before, the main creations of this kind are found in India.

In other countries, to a lesser extent, more or less regular caves were also hewn out, or existing caves enlarged. The spirit of hewing out of rock is also sensed in built houses where the volume of pillars and other internal parts is not less than the free space between them. The ancient buildings of Egypt sometimes give us this impression. [In the continuation of this architectural tendency, however, in which space was victorious over existing mass, mass again becomes dominant. In Southern India, ^(fig. 6) for example, a series of channels was made out of the body of the rock and free spaces were created around the solid mass, which became isolated and continued to exist in its plastic form. This ~~solid mass~~ was shaped by stone-hewers, masons and sculptors into the form of houses. The outside surface of the houses was embellished with an abundance of sculptures and reliefs, and the workers penetrated into the houses and created rooms. Outside India, e.g. in the vicinity of Jerusalem, this principle ^(of monolithic buildings) is realized to a more limited extent.

Now that we have considered these phenomena, which have considerably enlarged the accepted idea of architecture, we shall deal with the idea of architecture in its more restricted sense, and in the first instance with its methods. Here again we are faced with the principle of mass, but in another sense, in the sense of the visual appearance of the building. When they are built with complete walls, buildings produce the optical illusion of masses, i.e. of closed solids; this illusion remains even after it is lightened, or even abolished, by the introduction of openings or other means of aesthetic animation such as projections and indentations. This principle is followed in the majority of buildings from ancient

Mesopotamia to the Romanesque churches of Western and Central Europe. The main body of the Roman Pantheon, ^(fig. 7) or ~~of~~ the Palace of Strozzi (early Renaissance period), are classic examples of this kind of creation. ^(fig. 8) Very many of the gigantic buildings in modern America also belong to this category. Their mighty masses are at times shaped with an almost musical rhythm, with reciprocating connections, with harmony between parts and with descending movements within a general ascending motion. In the contrasting system a differentiation in construction is developed. The decisive ^(parts) of the Greek or the Chinese house are columns which support the entablature and the roof. The walls are nothing other than partitions which enclose the interior. In Ancient Greece ^(fig. 9) these partitions were placed inside the columns, and in the Far East ^(fig. 10) they had no particular position, sometimes outside the columns, sometimes behind them or between them. The most daring and ingenious example of differential construction is, without doubt, the Gothic one. Entire bundles of columns rise up inside the building ^(fig. 11) and their capitals do not hinder the intensity of the soaring process, but act as a kind of springboard which allows the motion to continue into the ribs of the vaults. The segments which are spanned across the ribs are mainly "fillers", just as are the walls between the supporting parts. This renders possible a great freedom in the creation of openings, windows and doors, the size of which has hitherto been unknown. Apart from the system of internal pillars, there is a second system of pillars ^(called buttresses) which rises up outside, ^(fig. 12) and runs along the length of the building alongside its aisles. Above these ^(side) aisles flying buttresses project from the high nave and transfer a decisive part of the ^{thrust} weight of the ^{its vault} walls onto the external pillars. *vertical buttresses.*

This method of construction will bring us of necessity to aesthetic categories proper. Their ^{primary} ~~first~~ conditions are the qualities of the materials used. Let us remember the Babylonian and Assyrian buildings ^(fig. 13) in which the volume of the walls sometimes exceeds the size of the room. This strange thickness of the walls is the logical outcome of the use of inferior materials. While the rich quarries ~~within the borders~~ of the country of the Nile gave to Egyptian architecture splendid possibilities for enduring works, the materials found in the countries around the Euphratus and the Tigris were in the main clay or lime, which, even when pounded, is unable to resist the force of rain water after a long time. A certain amount of preservation produced air-dried tiles. Better tiles were obtained by firing and additional strength was given to the surfaces by glazing. Though unintentional at first, these technical means led to aesthetic improvements. Glazing led to colourful enrichment and to the decoration of the outside with ornaments and figures. The surface of the walls was also broken up ^{by} ~~up~~ projecting and receding parts. Conditions such as these gave birth to "façades" (not only in Mesopotamia), and they explain the existence of ^{the} ~~façades~~ in general, i.e. the adorned face of the house. Only when the material itself is inferior does a technical and aesthetic covering and enveloping become necessary. It is understood that the façade is, in itself, and according to its proper nature, a thing untrue, or even artificial or fictitious. Only in the most highly developed architecture was the façade also able to become a faithful expression of the interior organization and structure of the house. When, however, the material is superior by nature, the need for any camouflage does not arise. It will show itself in its naked

form and its appearance, in all its naivety, will assume artistic worth. The Greek house is a good example also of the qualities resulting from the use of superior materials. In modern architecture, or at least in its early stages, an appreciation of the ^(correct) use of ~~superior~~ materials was born anew. The first pioneers in this venture, who wished to do justice to ~~this kind of~~ material, disapproved of imitation, i.e., the creating in metal of forms characteristic of wood, or by colouring sheets of tin to give the impression of marble. Every material has its own innate property of shaping, and if materials are modelled according to the properties of other materials, it is considered a falsification. In modern architecture the tendency to exhibit and emphasize the ~~the~~ nature of steel, concrete, glass, etc., prevails. This emphasis became a rich source of beauty. [In order to attain beauty in architecture, two further courses were adopted. One employs a variety of additions and trimmings, and in extreme instances the influence of craftsmanship, painting and sculpture are evident. Such buildings are planned as if with the main intention of giving a visual impression akin to painting. In some styles of Islamic architecture ^(fig. 14) houses were built with the clear intention that they should look like pictures. Furthermore, the abundance of adornment sometimes hides the body of the house and detracts from it. Ornamentation rich in taste and imagination frequently increased in inverse proportion to pure architecture. At times trimming prevailed also in the Russian art of building, particularly during the periods when the Church flourished. In the Cathedral of Basilus in Moscow, for instance, the load of ornaments envelops most of the building, and almost ~~most~~ ^{all} the whole of the body of the structure is hidden. The towers or cupolas, in their weird multiplicity, no longer serve any use or purpose, and

which may be only a cube or a composition of some elementary geometrical bodies. [We have already been reminded, in passing, of the visual and psychological effects of lines ^{or} directions in the appearance of buildings. The example which has long been popular is the Gothic style with the prevailing upward direction of its lines. We shall not consider here the origin of this verticalism. We ~~shall~~ ^{here} try to understand this phenomenon only from the point of view of ^(the influence which it exerts upon) the onlooker: The system of pillars, joined together in pointed arches, at a great height, raises us from the material world and awakens in us spiritual feelings. One of the Indian styles is, in certain aspects, close to the Gothic. It is also full of movement and one direction prevails, and all the lines are arranged according to this direction; the decisive principle, however, in these Indian sanctuaries is the horizontal tendency. ^(fig. 16) The houses are built of ~~layers upon~~ ^{which} layers of stone, and all these layers are superposed upon each other horizontally; even the towers rise up to their summits only by the piling up of horizontal layers until the required height is reached. The European baroque style, ~~however~~, despite its recklessness and ^{also} unrestricted movement, shows one dominant principle of movement, the diagonal. Just as the vertical line elevates, and the horizontal line, in its multiplicity moves the spirit and draws it far away, so the diagonal line excites the onlooker and prepares him for feelings of enthusiasm, or even of ecstasy. A similar factor of movement, which is equally important, is that of length, when it imposes itself upon the other dimensions. This direction is noticeable mainly in English architecture. Even the physical movements of the onlooker in these grand buildings adds to the feeling of dynamics which the great length ^{causes.} ~~creates.~~ The common feature of these styles, therefore, is an

expression of movement, a play of forces, action, dynamics, a form approaching organic life. Opposed to this, the Egyptian^{Pyramid}, for example, is a sign of the quiescent form, of eternal existence, of statics and of inorganic being. To some extent the horizontal line can also be considered as static - in so far as a multiplicity of horizontal lines does not cancel the static state. In its function as the base of an obtuse-angled isosceles triangle, the horizontal line is a decisive feature of Greek architecture and its revival ^{of} ~~of~~ all periods. In contrast to the group of dynamic styles, the Greek style is not dominated by one line which oppresses or abolishes other forming forces, but both the horizontal and the vertical forces are together effective, as is partly also the diagonal; and only the final result of all these movements is a state of quiescence, an expression of tranquillity, security and repose. We have no clear idea of the aesthetic impressions which the early Mesopotamian architecture made in its original state, and we can only imagine that the composition of horizontal and vertical strips and lines gave the impression of a serious and solemn taste. This was perhaps also the general appearance of Solomon's Temple, ^{about} ~~ca~~ which we have ^{received} ~~received~~ so much information from the biblical sources but nothing about its general form. Its appearance was, without doubt, magnificent and made a deep impression on all who saw it. — A liberation of spiritual forces, ^(or the arising of) feelings of greatness and harmony * was at all times the psychological outcome of all kinds of arches ^(fig. 17) and, in particular, ^(of parts) of the circle; this is the case in cupolas built as hemispheres or similar shapes. The most perfect examples of Roman, Byzantine and Renaissance architecture evoke in us such feelings. [However, in these aesthetic values are included only features of the building itself and of its appearance. The reaction

which exists between the building and its surroundings is not the least ^{essential} ~~decisive~~ of these values. In ^{Far Eastern} ~~Chinese~~ ^(fig. 18) buildings, for instance, ~~it is as if~~ in both the single houses and in groups of houses or whole architectural complexes, there is a tendency to adapt the building to its natural surroundings so that it may conform ^{to} ~~with~~ them as perfectly as possible, and grow out of them. Human achievements follow nature, the building taking the lines of the landscape which is again itself ^{reflected} ~~mirrored~~ in the house. This relationship can be explained by a conception of the universe common to the religions and all the philosophical schools of China. According to this conception, the Universe is the model, the teacher and the standard. The "three powers" are Heaven, Earth and Man. Man, who is only the ^{these} third of three elementary forces, depends wholly on the other two. As he adapts himself more and more to nature, to its cycles and periodicities, and arranges his life according to the model of the universe, so he achieves moral perfection and happiness. It is easier, therefore, to find in a ^{or Japanese} Chinese building the tendency to immerse itself into the landscape ^{rather} ~~than~~ to rise above it.

"Monumentality" - the striving after large dimensions and the expression of might and endurance - is foreign to architecture of the Far East. There are no gigantic buildings, only regular and systematic multiplicities of houses of modest dimensions. The adapting of the house to nature does not depend on the individual taste of the architect only, but it is an old-age traditional system (called by the Chinese "winds and water") which regulates this adaptation ⁱⁿ in all its details. The principle, contrary to that pertaining in China, is geographically further extended according to the character of people, and in particular of ~~Westerners~~ ~~Occidentals~~. This rather

more ^{Western} Occidental principle emerges from the desire to make the building dominate its surroundings. The house, so to speak, wishes to appear prominent, to be visible at a great distance, to stand out and subdue the world around it. ^(fig. 19) The castles, which were built in Europe in the Middle Ages, were ^{mostly} bold, grim and unyielding in aspect. There are in this category, however, also creations of friendly ^{appearance} aspect. The main ^{feature} thing is that these buildings dominate and subdue their surroundings. The value of this dominance is not necessarily a negative one, or not exclusively negative. In this form of ^(character) architecture the existing conditions as well as the ~~form~~ of the landscape can also be taken into consideration by the more or less sensitive reaction of the builder to the surroundings. Architecture attains creative domination when it prevails on the landscape not only by ^{producing} ~~making~~ an impression, but by material working on the surroundings and shaping them. In the planning of gardens around the building, and thus preparing the onlooker for the building itself, this principle is developed and perfected. ^(fig. 20) The Taj Mahal mausoleum, which was built in the 17th. Century near Agra in India by one of the Moslem Emperors for his wife, who had died at a prematurely early age, is a vision in white marble, and the landscape around is transformed into one ^{vast} ~~significant~~, ^{absolutely highly} ~~breath-takingly~~ impressive garden. ²⁾

2) In connection with this masterpiece, let us remember garden

architecture in general and, in particular, three of its main styles.

^{concentrated}
The Chinese garden is ~~centred~~ in nature and reflects its rich variety in miniature form; the Persian garden is further removed from the natural state of the landscape and shapes it in a formal manner; the French garden, particularly that modelled on the gardens of Versailles, introduces into the landscape artificial forms, foreign

to nature, yet the result is superb due to the vast amount of planning put into its creation.

Following on this architectural category, the striving for the dominance of nature, let us again remind ourselves of the idea of "monumentality" and its meaning. The tendency to immortalize rulers and ruling social groups led primarily to the creation of solemn and enduring architectural shapes, which evoked in the onlooker a feeling of his smallness. When viewing the best types of monumental building, however, he is not abandoned at this stage, but is finally uplifted. Greatness radiates from these buildings and awakens in the onlooker a feeling of awe and adoration. He will indeed become smaller, so to speak, and bow his head, but together with this feeling of adoration and in spite of it, there will be aroused in him unique feelings of happiness. Perhaps this psychological reaction could be explained by saying that it is as if the onlooker is sharing the creation.

The majority of architectural constructions were created anonymously. Most of the creators therefore worked for the love of the work itself and dedicated their lives to it. But still more worthy of our admiration are whole generations who sacrificed themselves to these creations, knowing that they had no hope of seeing their labour completed or enjoying the fruits thereof. This heroism can be understood only by the force of thought and ^{great} noble ideas which inspired these generations to the point of self-sacrifice. This is the ^a finest moral lesson which architecture teaches.